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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/765,806 | 01/19/2001 | Robert L. Gerlach | F064 | 9171 |
| 25784 | 7590 | 04/08/2004 | | |
| MICHAEL O. SCHEINBERG P.O. BOX 164140 AUSTIN, TX 78716-4140 | | | EXAMINER EL SHAMMAA, MARY A | |
| | | | ART UNIT 2881 | PAPER NUMBER |
| DATE MAILED: 04/08/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------|--------------------------------|--|
| Office Action Summary | Application No. 09/765,806 | Applicant(s) GERLACH ET AL. | |
| | Examiner Mary A. El-Shammaa | Art Unit 2881 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 19, 20, 22-25, 27, 29 and 30 is/are rejected.
- 7) ☒ Claim(s) 10, 18, 21, 26, and 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 10 is merely a repetition of the amendment to claim 9.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1- 7, 9-12, and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Engelsberg (6,048,588).

Regarding claims 1, 9-12, and 15-17, Engelsberg discloses a method and apparatus for using a focused beam of ions to deposit material onto a target or to remove material from a target comprising extracting ions from an ion source; forming the ions into a non-Gaussian, shaped ion beam having at a target plane an average current density lower than that of a similar beam without shaping; providing a target, directing a jet of working material towards the target; and directing the ion beam toward the target, the ion in the beam inducing a reaction of the working material to deposit material onto the target

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or to remove material from the target (*See* Abstract; col. 1, lines 25-65; col. 4, lines 45-60; col. 5, lines 1-57; col. 6, lines 25-57; col. 10, lines 42-61; col. 11, lines 8-52; col. 27, lines 55-67; col. 28, lines 30-67; col. 29, lines 19-27).

Regarding claims 2-4, Engelsberg discloses a first lens, forming an image of the ion source onto a second lens; passing the ions through an aperture; and forming an image of the aperture onto the target; and furthermore underfocusing the ion beam to produce uniform current density at the target surface (*See* Abstract; col. 1, lines 25-65; col. 4, lines 45-60; col. 5, lines 1-57; col. 6, lines 25-57; col. 10, lines 42-61; col. 11, lines 8-52; col. 27, lines 55-67; col. 28, lines 30-67; col. 29, lines 19-27).

Regarding claim 5, Engelsberg discloses the non-Gaussian, shaped ion beam being characterized in the target plane by a current density profile having a geometric feature with an edge resolution that is similar to that of a beam without shaping, thereby producing features on the target as fine as those produced by an unshaped beam (*See* Abstract; col. 1, lines 25-65; col. 4, lines 45-60; col. 5, lines 1-57; col. 6, lines 25-57; col. 10, lines 42-61; col. 11, lines 8-52; col. 27, lines 55-67; col. 28, lines 30-67; col. 29, lines 19-27).

Regarding claim 6, Engelsberg discloses etching or depositing at the target a pattern corresponding to the shape of the ion beam and then stepping the ion beam to repeat the pattern (*See* Abstract; col. 1, lines 25-65; col. 4, lines 45-60; col. 5, lines 1-57; col. 6, lines 25-57; col. 10, lines 42-61; col. 11, lines 8-52; col. 27, lines 55-67; col. 28, lines 30-67; col. 29, lines 19-27).

Regarding claims 7 and 14, Engelsberg discloses positioning a straight edge in the path of the ions near the beam center, thereby forming a shaped ion beam having at the

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target plane a straight edge with high edge resolution and producing on the target a feature having a straight edge (col. 27, line 51 through col. 28, line 67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Engelsberg in view of Corbin et al. (5,973,295).

Regarding claims 8 and 13, Engelsberg discloses directing a precursor gas toward the target in addition to directing the jet of working material towards the target (col. 4, lines 46-60; col. 6, lines 25-66). Engelsberg does not disclose the reaction induced by the ion beam including the deposition of a conductive or insulating material. Corbin et al. discloses the deposition of a conductive or insulating material onto a target (Col. 1, Lines 7-9; Col. 5, Lines 23-26). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus and method of Engelsberg with the teachings of the deposition of a conductive or insulating layer by Corbin et al. so as to increase the versatility of the apparatus and method.

Claims 19, 20, 22, 23, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohnishi et al. in view of Applicants' admitted prior art.

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Regarding claims 19 and 22, Ohnishi et al. discloses in Figs. 1 and 2, a method and apparatus for producing a shaped ion beam (1) comprising emitting ions from an ion source (100); passing the ion beam (1) through an aperture (102) between the first lens and second lens thereby producing on the target surface an ion impact area having the shape of the aperture (Col. 3, Lines 7-28). Ohnishi et al. does not disclose forming an image of the ion source (100) using a first lens (101) and forming an image of the aperture (102) onto a target surface, thereby producing on the target surface an ion impact area having the shape of the aperture. The Applicants disclose in the Specification a known method of forming an image of the aperture onto the target to form a beam having higher resolution (page 2, lines 12-21). It would have been obvious to one having ordinary skill in the art at the time the invention was made to form an image of the ion source and form an image of the aperture because this would result in a desirable beam having high resolution at the edges of the beam.

Regarding claim 20, the Applicants disclose a known method of under focusing the ion beam for Gaussian, shaped beams (page 4, lines 14-22). It would have been obvious to one having ordinary skill in the art at the time the invention was made to under focus the beam because this would achieve the desired non-Gaussian, shaped beam with high resolution at the edges.

Regarding claim 23, Ohnishi et al. discloses a method of producing a shaped ion beam comprising emitting ions from an ion source (100); forming an ion beam (1) from the emitted ions; and passing the ion beam (1) through an aperture (102) (Col. 3, Lines 7-18). Ohnishi et al. does not disclose focusing the ion beam onto a focal plane beyond a target plane to produce at the target plane a beam having a diameter or size greater than

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the diameter that the beam would have at the focal plane and having an edge resolution not significantly degraded from that of the unshaped beam. The Applicants disclose a known method of under focusing the ion beam for Gaussian, shaped beams (page 4, lines 14-22). It would have been obvious to one having ordinary skill in the art at the time the invention was made to under focus the beam because this would achieve a beam having a diameter or size greater than the diameter that the beam would have at the focal plane and having an edge resolution not significantly degraded from that of the unshaped beam.

Regarding claim 29, Ohnishi et al. discloses an apparatus for producing a shaped ion beam, the apparatus comprising an ion source (100) providing ions for forming an ion beam along an optical axis; an aperture (102) positioned after the ion source and restricting the ion beam; and a lens (106) (Col. 3, Lines 9-18). Ohnishi et al. does not disclose under focusing the beam to a crossover point beyond the target plane. The Applicants disclose a known method of under focusing the ion beam for Gaussian, shaped beams (page 4, lines 14-22). It would have been obvious to one having ordinary skill in the art at the time the invention was made to under focus the beam because this would achieve the current density at the target plane being uniform.

Claims 24, 25, 27, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohnishi et al. in view of Applicants' admitted prior art in further view of Jones.

Regarding claims 24, 25, and 30, Jones discloses a rectangular aperture comprising a knife-edge positioned near the center of the beam (See Figs. 6 and 7). It

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would have been obvious to one having ordinary skill in the art at the time the invention was made to include this structure to control the shape of the beam at the target plane.

Regarding claim 27, the Applicants disclose a known method of under focusing the ion beam for Gaussian, shaped beams (page 4, lines 14-22). It would have been obvious to one having ordinary skill in the art at the time the invention was made to under focus the beam because this would achieve the desired non-Gaussian, shaped beam with high resolution at the edges.

Allowable Subject Matter

Claims 18, 21, 26, and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed December 16, 2003 have been fully considered but they are not persuasive.

In response to Applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a shaped beam having uniform current density at the target) are not recited in rejected claims 19, 22, 23, and 29. Although the claims are interpreted in light of the

specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary A. El-Shammaa whose telephone number is 571.272.2469. The examiner can normally be reached on M-F (8:30am-5:00pm).

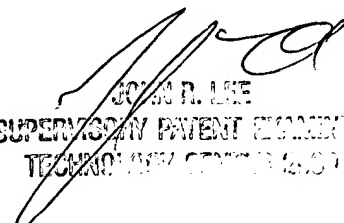
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on 571.272.2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MAE

April 5, 2004


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